WOLF CREEK
NUCLEAR OPERATING CORPORATION

Donna Jacobs
Plant Manager

JUN 2 8 2002

WO 02-0034

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: Docket No. 50-482: Licensee Event Report 2002-003-00, Reactor Protection System Actuation and Reactor Trip due to Feedwater Regulating Valve Control Card Failure.

Gentlemen:

The enclosed Licensee Event Report (LER) 2002-003-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) regarding an actuation of the Reactor Protection System including an automatic reactor trip at Wolf Creek Generating Station.

Wolf Creek Nuclear Operating Corporation has made no commitments in the enclosed LER.

If you should have any questions regarding this submittal, please contact me at (620) 364-4246 or Mr. Tony Harris at (620) 364-4038.

Very truly yours,

Donna Jacobs

DJ/rlr

Enclosure

cc: J. N. Donohew (NRC), w/e
D. N. Graves (NRC), w/e
E. W. Merschoff (NRC), w/e
Senior Resident Inspector (NRC), w/e

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
WOLF CREEK GENERATING STATION	05000482	1 OF 4

4. TITLE

Reactor Protection System Actuation and Reactor Trip due to Feedwater Regulating Valve Control Card Failure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	08	2002	2002	– 003	– 00	06	28	2002	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1
10. POWER LEVEL	100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)	X	50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Karl A. (Tony) Harris, Manager Regulatory Affairs	(620) 364-4038

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	SJ	IMOD	W120	YES					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO				

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 8, 2002, at 5:07 p.m., Wolf Creek experienced an automatic actuation of the Reactor Protection System (RPS) including an automatic reactor trip due to low water level in the "D" steam generator (SG). This actuation occurred following the closure of the "D" SG main feedwater regulating valve (FRV) during surveillance testing. When the FRV closed, "D" SG level decreased below the reactor trip setpoint of 23.5 percent, initiating a reactor trip. The unit received a feedwater isolation and auxiliary feedwater actuation (both motor and turbine driven) because of the low-low SG levels. All control rods fully inserted, and the RPS and the Engineered Safety Features (ESF) Systems performed as expected.

The cause of the FRV closure was the failure of a Westinghouse 7300-series manual controller card for the "D" SG FRV. The failed controller card was replaced.

The safety significance of this event is low. This event is bounded by the current licensing basis analyses as reported in Wolf Creek Generating Station (WCGS) Updated Safety Analysis Report (USAR) section 15.2.7 "Loss of Normal Feedwater Flow." All safety related equipment performed as expected. There were no adverse effects on the health and safety of the public.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
WOLF CREEK GENERATING STATION	05000482	2002	-- 003	-- 00	2 OF 4

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

Background:

Steam generator (SG) [EIIS Code: SG] water level is normally controlled automatically using circuitry that compares existing SG level with a programmed reference level. The result of this comparison, or "level error," generates a signal to the Main Feedwater System [EIIS Code: SJ] regulating control valve (FRV) for the respective SG, which results in adjustments in the FRV position. This automatic "positioning signal" can be manually controlled only when the manual/automatic control station on the main control board (MCB) is placed in manual control. While in manual control, the level error signal is ignored by the flow-controlling device. The operator controls the valve position signal by "increase" and "decrease" pushbuttons on the control station.

Plant Conditions Prior to the Event:

MODE – 1
Power – 100 Percent
Normal Operating Temperature and Pressure

Event Description:

On May 8, 2002, at 5:07 p.m., during the performance of step 8.3.1.35 in surveillance test STS IC-202A (Channel Operational Test of Tavg, dT, and Pressurizer Pressure Protection Set Two), Control Room operators placed the control of "D" SG FRV in manual control, resulting in the FRV closing immediately. When efforts to open the FRV using manual control were not successful, control of the FRV was returned to automatic. When the FRV controller was returned to automatic, the FRV immediately responded to the open signal. However, the loss of main feedwater (FW) flow to the SG caused water level in the "D" SG to decrease below the reactor trip setpoint of 23.5 percent, resulting in an automatic reactor trip.

All control rods fully inserted, and all safety related equipment performed as designed. The Reactor Protection System (RPS) and the Engineered Safety Features (ESF) Systems performed as required. The plant received a FW isolation and auxiliary feedwater actuation (both motor and turbine driven) because of the low-low water level in the "D" SG. Transition to stable, hot standby conditions was completed at 5:45 p.m. Other than the surveillance in progress, there were no structures, systems, or components (SSCs) out of service at the time of the reactor trip that contributed to this event.

Basis for Reportability:

The reactor trip and subsequent actuation of ESF Systems described in this event is reportable per 10 CFR 50.73(a)(2)(iv)(A), which states, in part, that "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section." Paragraph (B)(1) of 10 CFR 50.73(a)(2)(iv) includes "Reactor protection system (RPS) including: reactor scram or reactor trip."

Root Cause:

The failure that initiated the closure of the "D" SG FRV and subsequent reactor trip has been identified as an "infant mortality" failure of the output stage of the associated Westinghouse 7300 Process manual controller card. When the control of the "D" SG FRV was switched at the MCB to manual mode, per step 8.3.1.35 of STS IC-202A, the FRV failed in the closed position because the manual controller card had failed.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
WOLF CREEK GENERATING STATION	05000482	2002	003	00	3 OF 4

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

The failed manual controller card has been returned to the vendor (Westinghouse) for hardware failure analysis.

Corrective Actions:

Calibration surveillance testing underway at the time of the reactor trip was immediately suspended. Emergency Operating Procedures for response to the reactor trip were entered. Transition to minimum load at hot standby conditions was completed by 5:45 p.m. the same afternoon. Plant staff conducted walkdowns of the Turbine, Auxiliary, and Containment buildings. These walkdowns found no other concerns with the status of any SSC that could have been affected by the FW regulating valve closure and subsequent trip.

The failed Westinghouse 7300 manual controller card was replaced with a new controller card. Tests to validate the satisfactory performance of the replacement controller card were performed prior to and after card installation.

Maintenance work orders have been implemented to provide for checking of manual controller card output prior to the quarterly performance of Instrumentation and Control (I&C) maintenance procedures STS IC-201, STS IC-201A, STS IC-202, and STS IC-202A. These procedures are the only I&C maintenance procedures with steps that require switching FRV control at the MCB from automatic to manual.

Safety Significance:

The safety significance of this event is low. This event is bounded by the current licensing basis analysis as reported in Wolf Creek Generating Station (WCGS) Updated Safety Analysis Report (USAR) section 15.2.7 "Loss of Normal Feedwater Flow." The event reduced normal FW flow to the "D" SG, resulting in the reduction of level in the secondary side of the SG. The reduction in SG level provided the input to trip the reactor, isolated all normal feedwater, and started the motor and turbine driven auxiliary feedwater pumps. There were no adverse effects on the reactor core, the Reactor Coolant System, or the Main Steam System, due to the Auxiliary Feedwater System's capacity to supply the necessary heat sink.

All safety related equipment performed as designed and there were no adverse effects on the health and safety of the public.

Previous Events:

WCGS LER 1999-008-00 documents a previous occurrence of a Westinghouse 7300 series controller card failure. Contrary to the event described in this LER, the cause of the 1999 event was attributed to random failure of the SG level controller card, and not associated with an "infant mortality" failure of the controller circuitry. As a corrective action, a modification was made to the SG water level control circuitry. This modification replaced a single driver controller card associated with each FRV with a pair of controller cards. One controller card provides control signal output when automatic control is selected on the MCB. The second controller card provides control signal output when manual control is selected. A feature of the modified design is that a FRV controller circuit power supply or automatic controller card failure will automatically switch the MCB controller station from automatic to manual control and retain the FRV position signal as is. Prior to this modification, in the event of a power supply failure or a failure of the single controller card, the associated FRV failed in the closed position.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
WOLF CREEK GENERATING STATION	05000482	2002	— 003	-- 00	4 OF 4

17. **NARRATIVE** *(If more space is required, use additional copies of NRC Form 366A)*

A search of operating experience reports from other plants identified 13 events in which Westinghouse 7300-series controller cards in FW control systems failed, resulting in FW transients and/or plant trips. In some cases, the only reported corrective actions were evaluation of the failed card and its replacement. In response to a reactor trip in 1990, one plant evaluated the feasibility of adding a redundant controller/driver card for FW regulating valve control, but did not implement the modification. Other plants have implemented dual controller card modifications similar to the modification made at WCGS.